The Death of "Mobile Learning"

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Abstract

Mobile Learning developed from the growing capabilities and adoption of mobile devices since the late 1990s. Subsequently, mobile devices have become an indispensable tool for many, resulting in significant societal changes. However, while they have been assimilated into people’s lives, higher education mobile learning initiatives typically isolate the use of these devices, and so do not reflect the way they are used by learners. This chapter seeks to make a case for the end of “Mobile Learning” as a discrete area, and argues for mobile devices to be seen as potent tools to be integrated into the wider learning ecosystem.

Keywords

Pedagogy; practice; future directions; embedded; integrated; active learning; evolution; development; behaviours; BYOD; Mobile First learning design; higher education; formal learning; informal learning.

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Introduction

'Mobile Learning' as a concept has now come to largely refer to the use of handheld smartphones and tablets to learn in a variety of situations, thereby diverging from earlier research that also considered laptops to be mobile learning devices (Lim, 1999). As mobile and supporting technologies have developed over time, so have the characteristics of mobile learning projects and research, moving from learners accessing and recording simple, static content on basic mobile phones and Personal Digital Assistants (PDAs) through to highly interactive learning experiences using rich media and sophisticated social interaction on highly capable smartphones and tablets. These technical developments have led to mobile learning becoming less content-oriented and instead more interaction-oriented, with egalitarian, informal learning communities based around particular websites or social networks encouraging the development of fully-online communities of practice and learning networks (Gikas & Grant, 2013).

This chapter provides a brief summary of the literature related to the shift towards more active pedagogies and the societal and institutional changes brought about by growing access to technology and online networks. In discussing these themes as they relate to mobile learning, we aim to challenge the current emphasis placed on mobile learning as a discrete concept rather than a deeply integrated use of technology, and suggest that this may be holding back the potential for these devices to transform learning more widely. While the authors' views are derived from their experiences within the United Kingdom (UK) higher education (HE) sector, the issues have relevance beyond this setting.

Background Literature

Contemporaneous developments have had a significant influence on the evolution of mobile learning and the use of mobile devices to support learning in HE institutions.

Adoption of Active Pedagogies in Higher Education

A growing trend in HE is the move away from the teacher-driven, didactic, content-delivery model of teaching, towards one that encourages learning by requiring students to be more active participants in the process. Pedagogical theories such as Vygotsky's (1978) Social Constructivism and Siemens' (2005) Connectivism have grown in popularity as the idea of learning being derived from social interaction has become more widespread. Similarly, the

use of Authentic Learning approaches, where the learning models ‘real-world’ contexts, projects and situations as closely as possible (Herrington, 2006), has grown in-line with the increased demands for education that is ‘relevant’ to the professional world and that helps learners develop transferable ‘soft-skills’ in addition to subject knowledge.

These changes to prevailing pedagogies have also been a factor in the development of the concept of hybrid Personal Learning Environments (PLEs) that reflect the interconnections between formal learning and informal, social interaction (Glover & Oliver, 2008). Dabbagh and Kitsantas (2012) suggest that such PLEs can help to foster self-regulated learning in HE learners, in particular. This straddling of formal and informal learning contexts is something for which tablets and smartphones, as personal devices, are ideally suited due to their deep integration into people’s lives and ability to facilitate varied interactions and deliver rich content (García-Peñalvo & Conde, 2015).

Mobile learning, with its association of moving between locations and contexts, has also been seen as a powerful tool for realising these pedagogical aims of personalised, active learning. The technological affordances of mobile devices, in particular their portability and ability to display high-quality media, has made them a commonly used tool in Experiential Learning (Kolb, 1984), ranging from immersive, situated Augmented Reality applications (Latif, 2013; Le, Pedro, Lim, Park, Park & Kim, 2015) through to providing a convenient mechanism to record reflections on learning during or soon after

an experience of activity (Traxler, 2007). Pedagogical models for mobile learning have been developed by several researchers (Park, 2011; Ozdamli, 2012), while others have developed lenses to enable the classification of mobile learning projects and activities (Kearney, Schuck, Burden, & Aubusson, 2012). Yet, as Lindsay (2016) points out by using Puentedura's (2010) Substitution-Augmentation-Modification-Redefinition (SAMR) model to classify the level of transformation brought to learning activities through the introduction of technology, mobile learning projects are often using technology solely as a more convenient replacement for existing practices rather than making full use of the affordances of the tools to redesign the learning and interaction. While this replacement reflects how we often adopt the use of mobile functionality in our personal lives, that it is largely facilitated by the tutor, and not by the learner, is a limitation of this approach.

Within UK HE specifically, a large part of this move towards active learning can be attributed to a national 'Employability' agenda that emphasises the development of soft-skills and professional behaviours as an expected result of degree programmes (Yorke, 2006). This agenda, driven by both employer requirements and students' employment expectations following graduation, has resulted in increasing alignment of university curricula and learning activities to the prevailing technological tools and ways of thinking and working in relevant professions. Therefore, as workplace adoption of mobile devices increases, so greater integration of the same devices within HE

becomes important for supporting Employability initiatives. (Burns-Sardone, 2014)

Evolution of Behaviours

Alongside these developments, human behaviours were responding to emerging possibilities afforded by mobile and online technologies (Postman, 1993; Agger, 2011; Amft & Lukowicz, 2009), including the development of a whole new relationship with the World Wide Web. Specifically, there was movement from a publisher-consumer model of information, to one where the publisher is also a consumer and switches freely between these different modes, and where communication is inseparable from consumption (ComScore, 2011). A more egalitarian web evolved, and services appeared that enabled people to very easily share their ideas and views with a worldwide audience. Wikipedia popularised the concept of shared ownership of information, of responsibility, trust and validity by explicitly giving permission to "change it if it's wrong" (Kittur, Chi, Pendleton, Suh, & Mytkowicz, 2007; Rowley & Johnson, 2013), while blogs made self-publishing highly accessible (Gurak, Antonijevic, Johnson, Ratliff, & Reyman, 2004; Kim, 2005), yet maintained some distinction between content producers and the community of commenters; the rise of social media platforms, such as Facebook and Twitter, where all users have equal 'voice', allowed users to connect and share in highly personalised and flexible ways;

and ‘instant message’ platforms, such as Facebook Messenger and WhatsApp, predominantly used on mobile devices, opened up opportunities for sophisticated, just-in-time organisation and communication between individuals, groups and communities (Fuchs, 2012), while facilitating richer relationships (O’Hara, Massimi, Harper, Rubens, & Morris, 2014). Crucially, these capabilities did not wed the user to a place or space, and in some cases exploited the multitasking flexibility of mobile technologies (Oulasvirta, Rattenbury, Ma, & Raita, 2012). These examples are not niche, merely used by few or dabbled with; they are pervasive, largely accessible, and each has made a significant impact on the behaviours of many. Therefore, learners largely come to HE primed with a personal understanding, context or relationship with each of these examples and where they make connections, see purpose and value, may adapt them to support and enhance their own learning.

This change is already visible in the classroom, as evolving smartphone technologies open up individual routes for personal preference and innovation (Jung, 2014; Lu, Yao, & Yu, 2005). For example: in the pre-smartphone era, the prevalent mode of note taking in lectures would be to sit, listen, handwrite notes, and file away for future reference; post-smartphone adoption however, and other behaviours become possible that encourage autonomous social constructivist and connectivist pedagogies:

- **Sophisticated note-taking** (Schepman, Rodway, Beattie, & Lambert, 2012): tools seamlessly integrate typed text with handwritten notes, rich media, and allow for real-time collaboration. Moving between tasks is an intuitive experience within the tool itself. Notes are available across multiple devices and shared on a cloud for access anywhere, at any time.
- **Synchronous networking** (Young, 2016)**:** for collaborative note taking, and online networked discussion, which may be formally directed by the tutor, or informal, opportunistic and autonomous; it could be limited to the classroom, or stretch beyond into external learning communities, without disrupting the lecture.
- **Critical analysis:** can be intuitive, supplementary knowledge building - salient points are researched online in situ (Gevelber, 2016), the student can reinforce their take on the lecture in real time,
- **Tangible engagement** (Pollard, 2014; Dervan, 2014)**:** Students complete learning activities using their devices, providing the tutor with fast, live data on learning progress, questions and key points can be captured and accessed by the tutor at any point.

It is significant that these behaviours do not need to be mediated by the tutor, the first three may be entirely spontaneous, student owned and led, and the fourth may be achieved with little management or coordination; this is certainly a shift from the way that mobile learning tends to be more commonly framed.

Additionally, consumer culture has made it acceptable for users to frequently upgrade their mobile hardware, whether to benefit from an advance in new or improved capability that they identify with (Boakye, McGinnis, & Prybutok, 2014), or to experience the hedonistic feeling of a new tool (Venkatesh, Thong, & Xu, 2012). So society has learned that it's acceptable for technology to be disposable, to be fickle with functionality, to experiment, to expect that the thing they want to do but currently can't will soon be possible, and this keeps expectations and behaviours moving forward (Deloitte, 2016).

Discussion

As societies, we have embraced mobile technology in many aspects of our lives, particularly in our social lives, to the point that smartphones and tablets have become our 'window on the world'. This is well illustrated in the phrases "Pics or it didn't happen" (Silverman, 2016), where the ubiquitous nature of the devices and their capabilities is used implicitly as a counter to online bragging - the implication being that everyone has a smartphone with a camera, so it should be easy to provide evidence for an outlandish claim - and "There's an app for that" (Chen, 2010), reflecting the vast array of possibilities or tasks that can be achieved via a mobile device. Yet, the methods by which mobile technology has been adopted in HE has differed significantly between educators and learners. Learners have rapidly integrated these tools into informal practice in a way that reflects their instinctual use in other aspects of life, such as by checking an online resource in a face-to-face learning

situation, or posting a photo of a piece of work to a social network for comment by peers. However, this same level of integration has been much slower to develop in mobile learning initiatives from educators, whose emphasis has mostly been in using the technology as a direct substitute for prior techniques, such as recording lab results on a tablet rather than in a book due to ease of sharing. In fact, research at the authors' institution showed that students prefer to use mobile devices as a means to develop and engage with personal learning networks rather than access university-provided materials and services (Kainz, Powell, & Thorpe, 2011). This highlights the fundamental contradiction with the way mobile learning is viewed by the two primary groups involved in it - for learners it is a personal, instinctual activity embedded in all other learning activity, while for the educators it is a specific type of activity and approach to learning.

In many ways, the growth in ownership of mobile devices and desire to use them as a fully integrated learning tool has been more willingly accepted and embraced by university IT departments than the general academic population. This is particularly evident in UK universities through the widespread development of 'Bring Your Own Device' (BYOD) policies and programmes, where the university provides the backbone infrastructure for people to use their own mobile devices, such as Wi-Fi, power outlets, and online access to services and software, rather than locking down services and only allowing access to 'approved' or university-supplied devices. BYOD implicitly

acknowledges that people value the affordances provided by mobile devices compared to fixed-location devices, and also want to use their own devices that they have configured to work in the way that they want to work. Further to this, the space between formal and informal learning experiences may now be exploited by learners, either using devices to augment, extend and support their own learning while remaining connected to the formal learning, or as a means for personal organisation and creating the 'social glue' (Madge, Meek, Wellens, & Hooley, 2009). In this way mobile use is woven throughout the learning experience.

The personal nature of mobile devices also offers challenges and benefits for their use as learning tools. The widespread adoption of the 'Cloud' has shown that technology is a living, breathing ecosystem that we can access any way we like, for whatever purpose we need, using the tools we have to hand, whether they be mobile, traditional PC or laptop, or even a smartwatch. Mobile is merely the chosen window we increasingly look and operate through. The wealth of, frequently free, apps and online services that are available to support particular types of interaction or methods of working means that people are empowered to meet their own objectives using the methods and platforms with which they themselves are most comfortable, rather than needing to use tools selected by someone else (Woodcock, Middleton, & Nortcliffe, 2012). This enables individuals to select the appropriate tools to design their own methods of consuming and sharing

information, potentially even having completely different ones for different contexts, such as only using a particular app for social activity while using a different one to achieve the same outcomes in a learning or professional situation. This results in a tension between the ways in which people are using mobile tools and online services to create, manage and develop their own informal learning communities and processes and the ways in which mobile learning projects in HE often seek to define and control the types of interaction taking place.

The use of mobile devices primarily as a direct replacement of previous practices and methods has been strongly in evidence in formal projects since the inception of mobile learning and suggests that in its current form it may not be the catalyst for disruptive, yet sustainable pedagogical change (Cochrane, 2012). While mobile devices clearly offer increasing affordances that make them valuable and engaging tools to support and encourage learning, the development of specific pedagogies for mobile learning is a case of allowing the technology to define the learning, rather than the alternative and more considered approach where the choice of tool and learning activities are based upon required learning outcomes and the most appropriate method by which they can be achieved (Glover, Hepplestone, Parkin, Rodger, & Irwin, 2016). Combined with the speed at which mobile technology and its use in society is evolving, this relative lack of transformative mobile learning practices suggests that, while research into specific uses of mobile technology

is important, there is likely to be more benefit from research into fully integrating mobile learning into existing practices rather than treating it as a specialist area in itself.

However, while a deeper integration of mobile technology into formal learning activities is likely to be of greater benefit to learners and result in more transformative changes to learning and teaching, it is also likely to receive greater resistance from educators. Partly this is a result of the need to cede ‘control’ to learners over their own learning process rather than managing it directly and the resulting requirement to use pedagogies that focus on learning outcomes without dictating the method by which they are achieved, essentially requiring the educator to be a learning facilitator rather than an information transmitter, something that can be a challenge for HE educators in particular. These are significant issues that may take some time be resolved due to the profound cultural and professional identity changes that they require, however, much as with the key areas of development outlined above, there is also a technological element that needs to be addressed. Principally, the issue is one of developing educators’ confidence and capability in integrating mobile technology so that they are able to adapt their teaching to new technological developments, the resultant changes to the ways in which students seek to learn, and the challenges that arise. Ultimately, educators will need to, at a minimum, accept students’ use of these technologies and the changes they bring, as the increasing reliance on mobile

tools demonstrates that it is not going to be possible to restrict their use by learners in the future.

Conclusion

Technological changes to both mobile devices and online platforms have resulted in social changes that mean that smartphones and tablets have become indispensable devices for many people, yet, while they have become near ubiquitous, their use in HE is still often seen as specialist and distinct from other aspects of teaching and learning. This results in a tension between the way in which learners actually work, and want to work, and how educators want them to work, with learners organically creating their own learning networks and experiences while educators seek to use the tools to create discrete, defined mobile learning experiences. Ultimately, this conflict can only truly be addressed by educators accepting the use of mobile devices to learn however, whenever, wherever and with whoever suits the aims of individual students, as any attempt to actively prevent learners from using these tools is doomed to failure. As the prevailing pedagogical methods in HE move further away from the passive consumption of content delivered simultaneously to groups of learners towards the active construction of new knowledge based on shared investigation and social interaction, mobile learning needs to become a way to support these changes rather than continue to be viewed as a separate pedagogy. It is only by the tools largely ‘fading into

the background' that the full benefits of mobile devices within HE can be realised.

Implications for Future Practice/Research

By considering mobile learning as a distinct activity and pedagogical approach, there is a danger that educators will fail to see that the devices are rapidly becoming just another part of the overall learning landscape. Just as the web development community has adopted the concept of 'Mobile First' - the understanding that most access to a web page will be through a mobile device and therefore the web page should be designed initially to work well with such devices - so should HE begin to embrace the use of mobile devices as the preference of growing numbers of students and seek to ensure that these tools can be readily integrated into learning and teaching. While a role remains for projects that focus on the use of specific mobile technologies for specific learning outcomes, it is now time for HE to shift the core of its' attention toward normalisation and accepted practice, toward the development of transferable sustainable skills and behaviours that reflect a culture of lifelong learning.

References

Agger, B. (2011). iTime: Labor and life in a smartphone era. *Time & Society*, *20*(1), 119-136.

Amft, O.D., & Lukowicz, P. (2009). From backpacks to smartphones: Past, present and future of wearable computers. *IEEE Pervasive Computing*, *8*(3), 8-13.

Boakye, K.G., McGinnis, T., & Prybutok, V.R. (2014). Q-TAM: a quality technology acceptance model for technology operations managers. *Operations Management Research*, *7*(1-2), 13-23.

Burns-Sardone, N. (2014). Making the case for BYOD instruction in teacher education. *Issues in Informing Science and Information Technology*, *11*(1), 192-200.

Chen, B.X. (2010, October 11). Apple registers trademark for 'There's an app for that'. *Wired*. Retrieved from https://www.wired.com/2010/10/app-for-that/.

Cochrane, T. (2012). Secrets of mlearning failures: confronting reality. *Research in Learning Technology*, *20*.

ComScore. (2011). *Digital Omnivores: How Tablets, Smartphones and Connected Devices are Changing U.S. Digital Media Consumption Habits.* Retrieved from

http://www.comscore.com/content/download/10633/180227/file/Digital_Omnivores.pdf

Dabbagh, N. & Kitsantas, A. (2012). Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning. *The Internet and Higher Education*, *15*(1), 3-8.

Deloitte. (2016). *There's no place like phone: Consumer usage patterns in the era of peak smartphone*. Retrieved from http://www.deloitte.co.uk/mobileUK/assets/pdf/Deloitte-Mobile-Consumer-2016-There-is-no-place-like-phone.pdf

Dervan, P. (2014). Increasing in-class student engagement using Socrative (an online Student Response System). *AISHE-J: The All Ireland Journal of Teaching and Learning in Higher Education*, 6(3), 1801-1813.

Fuchs, C. (2012). Social media, riots, and revolutions. *Capital & Class*, *36*(3), 383-391.

García-Peñalvo, F.J. & Conde, M.Á. (2015). The impact of a mobile personal learning environment in different educational contexts. *Universal Access in the Information Society, 14*(3). 375-387.

Gevelber, L. (2016). How mobile has changed how people get things done: New consumer behavior data. Retrieved from https://www.thinkwithgoogle.com/articles/mobile-search-consumer-behavior-data.html.

Gikas, J. & Grant, M.M. (2013). Mobile computing devices in higher education: Student perspectives on learning with cellphones, smartphones & social media. *The Internet and Higher Education*, 19. 18-26.

Glover, I., Hepplestone, S., Parkin, H.J., Rodger, H., & Irwin, B. (2016). Pedagogy first: Realising technology enhanced learning by focusing on teaching practice. *British Journal of Educational Technology, 47*(5). 993-1002.

Glover, I., & Oliver, A. (2008). Hybridisation of social networking and learning environments. *Proceedings World Conference on Educational Multimedia, Hypermedia and Telecommunications.* 4951-4958.

Gurak, L., Antonijevic, S., Johnson, L., Ratliff, C., & Reyman, J. (2004). Introduction: Weblogs, rhetoric, community, and culture. *Into the Blogosphere*. Retrieved from http://conservancy.umn.edu/handle/11299/172840

Herrington, J. (2006). Authentic E-Learning in higher education: Design principles for authentic learning environments and tasks. *Proceedings World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education (ELEARN)*, 3164-3173.

Jung, Y. (2014). What a smartphone is to me: understanding user values in using smartphones. *Information Systems Journal*, *24*(4), 299-321.

Kainz, C., Powell, A., & Thorpe, L. (2011). *Mobile Strategy Strategic Review*. Unpublished internal report. Sheffield Hallam University.

Kearney, M., Schuck, S., Burden, K., & Aubusson, P. (2012). Viewing mobile learning from a pedagogical perspective. *Research in Learning Technology*, 20.

Kim, H. (2005). Blogs as the new media on the Internet. *Review of Communication*, *5*(2-3), 100-108.

Kittur, A., Chi, E., Pendleton, B.A., Suh, B., & Mytkowicz, T. (2007). Power of the few vs. wisdom of the crowd: Wikipedia and the rise of the bourgeoisie. *World wide web*, *1*(2), 1-9.

Kolb, D. (1984). *Experiential Learning: experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice Hall.

Latif, F. (2012). CARE: Creating Augmented Reality in Education. *Proceedings EdMedia: World Conference on Educational Media and Technology 2012,* 666-669.

Le, Q.T., Pedro, A., Lim, C.R., Park, H.T., Park, C.S., & Kim, H.K. (2015). A Framework for Using Mobile Based Virtual Reality and Augmented Reality for Experiential Construction Safety Education. *International Journal of Engineering Education*, *31*(3), 713-725.

Lim, D. (1999). Ubiquitous mobile computing: UMC's model and success. *Journal of Educational Technology & Society, 2*(4), 125-129.

Lindsay, L. (2016). Transformation of teacher practice using mobile technology with one-to-one classes: M-learning pedagogical approaches. *British Journal of Educational Technology*, *47*(5). 883-892.

Lu, J., Yao, J.E., & Yu, C.S., (2005). Personal innovativeness, social influences and adoption of wireless Internet services via mobile technology. *The Journal of Strategic Information Systems, 14*(3), 245-268.

Madge, C., Meek, J., Wellens, J., & Hooley, T. (2009). Facebook, social integration and informal learning at university: ‘It is more for socialising and talking to friends about work than for actually doing work’. *Learning, Media and Technology*, *34*(2), 141-155.

O'Hara, K.P., Massimi, M., Harper, R., Rubens, S., & Morris, J. (2014). Everyday dwelling with WhatsApp. *Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing*, 1131-1143.

Oulasvirta, A., Rattenbury, T., Ma, L., & Raita, E. (2012). Habits make smartphone use more pervasive. *Personal and Ubiquitous Computing*, *16*(1), 105-114.

Ozdamli, F. (2012). Pedagogical framework of m-learning. *Procedia - Social and Behavioral Sciences*, *31*, 927-931.

Park, Y. (2011). A pedagogical framework for mobile learning: Categorizing educational applications of mobile technologies into four types. *The International Review of Research in Open and Distributed Learning*, *12*(2).

Pollard, E.A. (2014). Tweeting on the Backchannel of a Jumbo-Sized Lecture Hall: Maximizing Collective Learning in a World History Survey. *The History Teacher*, *47*(3), 329-353.

Postman, N. (1993). *Technopoly: The surrender of culture to technology*. New York, NY: Vintage Books

Puentedura, R.R. (2010). *SAMR and TPCK: Intro to advanced practice*. Retrieved from http://hippasus.com/resources/sweden2010/SAMR_TPCK_IntroToAdvancedPractice.pdf.

Rowley, J., & Johnson, F. (2013). Understanding trust formation in digital information sources: The case of Wikipedia. *Journal of Information Science*, *39*(4), 494-508.

Schepman, A., Rodway, P., Beattie, C., & Lambert, J. (2012). An observational study of undergraduate students' adoption of (mobile) note-taking software. *Computers in Human Behavior*, *28*(2), 308-317.

Siemens, G. (2005, August 10). *Connectivism: Learning as Network-Creation*. Retrieved from http://www.elearnspace.org/Articles/networks.htm

Silverman, J. (2016, August 11). "Pics or it didn't happen" – the mantra of the Instagram era. *The Guardian*. Retrieved from

https://www.theguardian.com/news/2015/feb/26/pics-or-it-didnt-happen-mantra-instagram-era-facebook-twitter

Traxler, J. (2007). Defining, Discussing and Evaluating Mobile Learning: The moving finger writes and having writ.... *The International Review of Research in Open and Distributed Learning*, *8*(2).

Venkatesh, V., Thong, J.Y., & Xu, X. (2012). Consumer acceptance and use of information technology: extending the unified theory of acceptance and use of technology. *MIS quarterly*, *36*(1), 157-178.

Vygotsky, L.S. (1978). *Mind in society: The development of higher psychological processes*. Cambridge, MA: Harvard University Press

Woodcock, B., Middleton, A., & Nortcliffe, A. (2012). Considering the Smartphone Learner: an investigation into student interest in the use of personal technology to enhance their learning. *Student Engagement and Experience Journal*, *1*(1), 1-15.

Yorke, M. (2006). Employability in higher education: what it is–what it is not. *Learning and Employability Series*, *1*. York, UK: Higher Education Academy.

Young, J.R. (2016, September 21). How colleges should adapt in a Networked age. *The Chronicle of Higher Education*. Retrieved from http://www.chronicle.com/article/How-Colleges-Should-Adapt-in-a/237842